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IS 9917 (1983): Calcium Base Heat Stable Grease [PCD 3: Petroleum, Lubricants and their Related Products]

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कैल्शियम से बनें तप्त-स्थायी ग्रीज – विशिष्टि
(पहला पुनरीक्षण)

Indian Standard
CALCIUM BASE HEAT STABLE GREASE — SPECIFICATION
(First Revision)

UDC 621·892·2 : 661·842 : 621·822

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1993

Price Group 2

Lubricants and Related Products Sectional Committee, PCD 4

FOREWORD

This Indian Standard (first revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Lubricants and Related Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1981. The present revision of this standard has been prepared as the result of a review of the standard by the Technical Committee in the light of the present day requirements and advancement in the field of lubrication technology in the country. In this revision the requirements for Drop point and corrosion test have been modified. An additional requirement for water stability in the presence of water has also been added to reflect the better quality of the material now generally available in the market.

This specification covers requirements for calcium base heat stable grease for use of certain industries, such as steel plants and railways.

While preparing this standard, considerable assistance has been taken from the British Timken Specification for grease for normal temperature automotive, medium duty industrial and railway rolling stock axle box applications, issued by British Timken, Duston, Northampton, England (U.K.).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CALCIUM BASE HEAT STABLE GREASE — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the method of sampling and test for calcium base heat stable grease suitable for use in bearings operating in wet conditions.

2 NORMATIVE REFERENCES

The following Indian Standards contain provisions which through reference in this text constitute the provisions of the standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1447 (Part 3) : 1992	Methods of sampling of petroleum and its products: Part 3 Method of sampling of semi-solid and solid petroleum products (*first revision*)
1448 : 1966	Methods of tests for petroleum and its products

3 REQUIREMENTS

3.1 General Requirements

The grease shall be smooth, homogeneous preparation, uniform in consistency and free from objectionable odour, deleterious materials and other impurities, such as rosin, rosinates, tar oil, grit and fillers of any description. It shall not show any sign of breakdown hardening or tendency of the constituents to separate. It shall also be free from grains.

3.2 Composition

The grease shall be prepared from refined mineral lubricating oils and calcium soaps of fatty acid. Additives may be incorporated, if agreed between the purchaser and the supplier.

3.2.1 The mineral oil extracted from the grease by method 'A' prescribed in P : 59 of IS 1448 shall comply with the following requirements:

Characteristic	*Requirement*	*Method of Test, Ref to (P :) of IS : 1448*
(1)	(2)	(3)
i) Kinematic viscosity in cSt at 40°C	90 to 110	P : 25
ii) Flash Point, (COC) °C, *Min*	178	P : 69

3.3 The material shall also comply with the requirements given in Table 1, when tested according to the methods given in col 4 and 5 of the table.

3.4 Keeping Quality (Shelf Life)

The keeping quality of the material shall be such that when stored in original sealed containers under normal conditions, it shall retain the properties given in the specification for not less than one year from the date of manufacture of the product.

4 PACKING AND MARKING

4.1 Packing

The material shall be packed in metal or any other suitable containers as agreed between the purchaser and the supplier.

4.2 Marking

The containers shall be securely closed and marked with the following:

a) Indication of the source of manufacture;
b) Name of the material;
c) Net mass in the container;
d) Date of manufacture;
e) Recognized trade-mark, if any; and
f) Identification in code No. or batch No. to enable the lot or consignment to be traced back for the date of manufacture.

4.2.1 Each package may also be marked with the Standard Mark.

5 SAMPLING

5.1 Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 3) : 1992.

5.2 Criteria for Conformity

Individual samples shall be taken and tested for all the requirements as prescribed in 3.

Table 1 Requirements of Calcium Base Heat Stable Grease

(*Clause* 3.3)

Sl No.	Characteristic	Requirement	Method of Test, Ref to (P :) of IS 1448	Ref to Annex of This Standard
(1)	(2)	(3)	(4)	(5)
i)	Consistency of the worked grease at 25 ± 0·5°C		P : 60	—
	a) 60 strokes	220 to 250		
	b) 10 000 strokes	Shall not differ by more than 30 units from the 60 strokes value		
ii)	Drop point, °C, *Min*	130	P : 52	—
iii)	Free organic acidity (as oleic acid), percent by mass, *Max*	1·0	P : 53	—
iv)	Free alkalinity (as calcium hydroxide), percent by mass, *Max*	0·15	P : 53	—
v)	Corrosion test at 100°C, 24 hours	Bright copper and steel strips shall not show any discolouration after being partly submerged in the grease	P : 51*	—
vi)	Heat stability at 120 ± 1°C	No sign of breakdown, marked change in consistency or separation of oil	P : 62 Method A	—
vii)	Water content, percent by mass, *Max*	1·0	P : 40	
viii)	Heat stability test, 48 hours	No oil separation		A
ix)	Sulphated ash, percent by mass, *Max*	5·0	P : 4	—
x)	Resistance to water	Shall not emulsify with cold or hot water	—	B
xi)	Working stability in presence of water	−10 to +50	—	C

*For steel strips, the temperature of test and size of strips should be the same as that be made of mild steel conforming to IS 226 : 1975 'Specification for structural steel, standard quality (*fifth revision*)'.

ANNEX A

[*Table* 1, *Item* (viii)]

HEAT STABILITY TEST

A-1 OUTLINE OF THE METHOD

25 g of grease is heated to 120°C and held at that temperature for half an hour, then poured into a silica or glass tube which when cooled is suspended over a conical measure, graduated in ml in which the mineral oil that separates out in 48 hours is collected.

A-2 PROCEDURE

A-2.1 A sample of 25 g of grease is placed standard Pensky Marten flash point open cup and heated at the rate of 6°C per minute to 120°C. The grease is maintained at 120 ± 3°C for half an hour. During the heating and maintaining the grease at 120°C it is to be stirred at the rate of 2 revolutions per second for alternate minute.

A-2.2 After the grease has been held at a constant temperature of 120°C for half an hour, it is transferred into a silica or glass tube, approximately 75 mm long × 25 mm inside diameter, one end of which has been previously sealed with a rubber bung.

A-2.3 After half an hour atmospheric cooling, the bung is removed and the grease, supported by two pieces of flattened wire approximately 1·5 mm wide wound vertically round the tube, is suspended over a conical measure graduated in ml to collect the mineral oil that separates out in 48 hours.

A-2.4 The grease shall be regarded to have passed the test if there is no oil separation in 48 hours.

ANNEX B

[*Table* 1, *Item* (x)]

TEST FOR WATER RESISTANCE

B-1 PROCEDURE

B-1.1 A sample approximately 5 g of grease is placed in a 150 mm long × 25 mm ID test tube. The test tube is then half filled with cold distilled water and held for half an hour with manual agitation after every 5 minutes. After half an hour the grease is then examined for the formation of any emulsion with cold water.

B-1.2 The test tube and its contents are then slowly heated over a Bunsen burner to near boiling point without agitation and the condition of the grease is again examined for any emulsion formation with hot water.

B-1.3 The grease shall be regarded to have passed the test, if no emulsion is formed with either cold or hot water.

ANNEX C

[*Table* 1, *Item* (xi)]

TEST FOR WORKING STABILITY IN PRESENCE OF WATER

C-1 OUTLINE OF THE METHOD

The working stability is determined after prolonged mechanical working of the grease in presence and absence of water and determining the difference in penetration of the two samples.

C-2 APPARATUS

Penetrometer, cone, Grease worker and water bath as per P : 60 of IS : 1448 and Spatula.

C-3 PROCEDURE

C-3.1 Fill the grease worker cup with grease and assemble the worker as described in P : 60 and mark it as sample 1.

C-3.2 Fill a second cup with grease level 10 ± 0·5 mm from the top. Add 31·9 ± 0·1 ml of distilled water. Pack the perforated plate and cover of the grease worker with the grease to the top of its stroke and ensuring that the grease is flushed with the cover sheath. Open the vent and clear the hole through it using a straight piece of wire of suitable thickness, screw the cover sheath which seats on the rim of the cup. This cup now contains 10 percent of water by volume.

C-3.3 Take each sample in turn and press the perforated plate to the bottom of the cup with the vent closed and operate each worker mechanically to a total of 10 000 double strokes.

C-3.4 Open the vent and place the worker in the constant temperature bath at 25 ± 0·5°C for one and a half hour.

C-4 CALCULATION AND REPORT

C-4.1 Calculate the mean of three determinations for each sample and report the difference between the mean for sample 2 and the mean for sample 1.

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